MINISTRY OF EDUCATION AND CULTURE
UNIVERSITAS NEGERI SURABAYA
FACULTY OF MATHEMATICS AND NATURAL SCIENCES
DEPARTMENT OF PHYSICS
Ketintang Campus, Jalan Ketintang, C3 Building, Surabaya 60231
Website: http://s1-fisika.fmipa.unesa.ac.id/, email: s1-fisika@unesa.ac.id

Module Name :	*Termodinamika* Thermodynamics
Module level :	Bachelor degree/Undergraduate Programme
Course Code :	4520103209
Abbreviation, if applicable:	-
Courses included in the module, if applicable:	Not Applicable
Semester/Term	3/Second Year
Module coordinator(s)	Dr. Asnawi, M.Si
Lecturer(s):	Dra. Suliyanah, M.Si Dr. Frida Ulfah Ermawati, M.Sc Lydia Rohmawati, M.Si
Language:	*Bahasa Indonesia*
Classification within the curriculum:	Compulsory/ ~~Elective~~
Teaching format/class hours per week during the semester:	3 contact hours of lectures (Indonesia credit semester or sks*)
Workload :	a. Lecture: 2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79.33 total hours per semester ~ 3.18 ECTS b. Lab activity: 1x170 minutes lab activity, 14 weeks per semester 39.67 total hours of lab activity per semester ~ 1.59 ECTS Total of lecture and lab activity= 119 total hours per semester ~ 4.77 ECTS**
Credit Point:	3 sks (4.77 ECTS)

Requirements:	Basic Physics I Basic Physics II
Learning goals/competencies:	1. able to manifest character independently and honestly in carrying out thermodynamic lecture assignments 2. can analyze in a structured manner the concept of heat, the laws of thermodynamics to the existence of an ideal gas in a system to its application in thermodynamics 3. able to think critically, innovate, and work scientifically to study the laws of thermodynamics II and the Carnot cycle, and to be able to evaluate and be responsible both independently and in groups. 4. can formulate and mathematically formulate entropy systems, and be able to communicate scientifically and work effectively both individually and in groups.
Content	The thermodynamics course discusses the concepts/principles/theories/basic laws of thermodynamics (physics content knowledge) that underlies thermodynamic study materials in depth covering temperature and the zero law of thermodynamics, some simple thermodynamic systems, work, heat and the first law of thermodynamics. , ideal gas, second law of thermodynamics, Carnot cycle and thermodynamic temperature scale, and entropy, and able to communicate scientifically and work effectively both independently and in groups, with assessment in the form of assignments, mid test and final exam
Attribute Soft skill:	Scientific report, public speaking, and team work
Study/exam achievements:	Students are considered to complete the course and pass if they obtain at least 40% of maximum final grade. The final grade (NA) is calculated based on the following ratio:

Assessment Components	**Percentage of contribution**
Participation	20%
Assignment	30%
Mid-semester test	20%
Final semester test	30%

Learning Methods :	1. Student-centered approach, 2. Lecture and discussion, 3. Laboratorium activity 4. Presentations
Form of Media:	*Power Point* slides, e-book file, and multimedia.
Literature (primary references):	1. Mark W. Zemansky and Richard H.Dittman. 1997. Heat and Thermodynamics, Seventh Edition, McGraw-Hill,Companies, Inc 2. Darmawan B. 1990. Termodinamika. Jurusan Fisika FMIPA-ITB 3. Yunus A.Cengel and Michael Boles.1994.Thermodynamics An Engineering Approach, Second Edition, McGraw-Hill,Inc
Notes:	*1 sks in learning process = three periods consist of: (a) scheduled instruction in a classroom or laboratory (50 minutes); (b) structured activity (60 minutes); and (c) individual activity (60 minutes) according to the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 44 Year 2015 jo. the Regulation of Indonesia Ministry of Research, Technology, and Higher Education No. 50 Year 2018.
	**1 sks = 1,59 ECTS according to Rector Decree Of Universitas Negeri Surabaya No. 598/Un38/Hk/Ak/2019